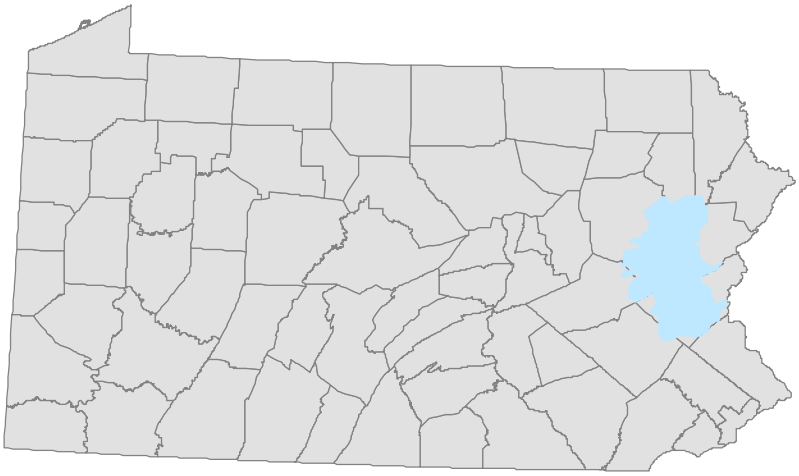


Rapid Watershed Assessment
Lehigh Watershed

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals.

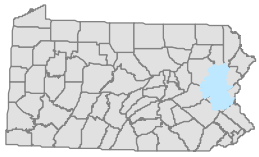
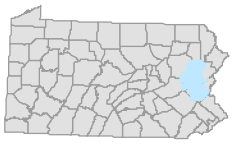


Table of Contents



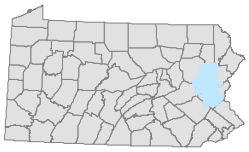
Preface

The Natural Resources Conservation Service (NRCS) is initiating rapid watershed assessments in order to increase the speed and efficiency generating resource information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers. While these rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide a foundation for watershed studies or area planning. In addition, the assessments provide the benefits of NRCS locally-led planning for resource conservation and conservation program implementation in less time and at a reduced cost than more complex studies.

Rapid watershed assessments will be valuable for Farm Bill program delivery, and provide useful information for county, watershed and regional planners. These assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments can help landowners and local leaders set priorities and determine the best actions to achieve their goals.

To produce the assessments, quantitative and qualitative data is collected and organized to create a watershed profile using Geographic Information System (GIS) technology. The data is analyzed to allow resource concerns and conditions to become apparent, and to generate maps and information to help people make better decisions about conservation needs and programs.

/s/ Craig R. Derickson
Pennsylvania State Conservationist

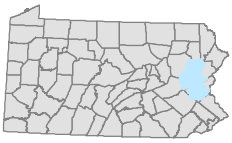


Introduction

The Lehigh Watershed is located in Eastern Pennsylvania in portions of Berks, Bucks, Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Schuylkill, and Wayne Counties. The watershed is slightly over 870,800 acres in size, of which approximately 178,500 acres is farmland. Seven Service Centers of the Natural Resources Conservation Service, ten county Conservation Districts and parts of the Pocono Northeast and Southeastern Resource Conservation and Development Council offices provide conservation assistance in this watershed.

	Acres in HUC	% Acres of HUC
Berks	14,041	1.6
Bucks	636	.1
Carbon	242,096	27.8
Lackawanna	26,647	3.1
Lehigh	177,699	20.5
Luzerne	84,726	9.7
Monroe	165,892	19.0
Northampton	114,283	13.1
Schuylkill	36,905	4.2
Wayne	7901	.9

Common Resource Area (CRA)[1]

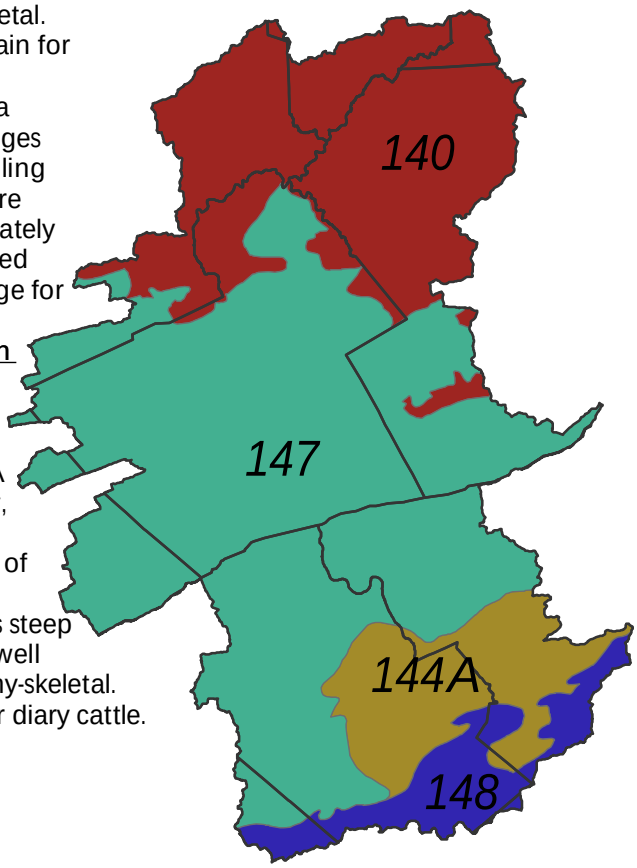


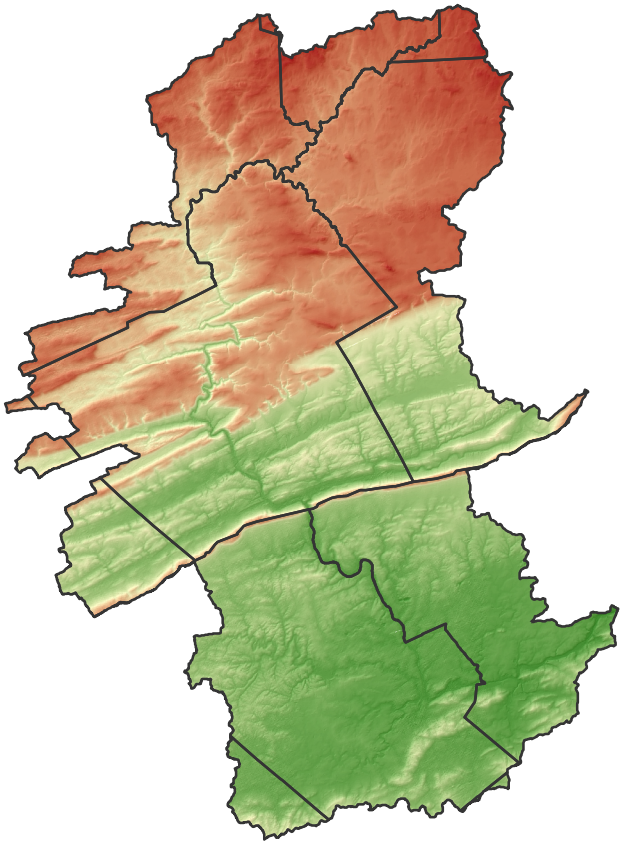
<u>140 - Glaciated Allegheny Plateau and Catskill Mountains:</u> This CRA is broad and nearly level to moderately sloping. The narrow valleys have steep walls and smooth floors. Soils are shallow to very deep, well drained to very poorly drained, and loamy or loamy-skeletal. Principle crops in the area include hay, pasture, and some grain for diary cattle.

<u>147 - Northern Appalachian Ridges and Valleys:</u> This CRA is a folded and faulted area of parallel ridges and valleys. The ridges are strongly sloping to extremely steep and have narrow, rolling crests. The valleys are mainly level to strongly sloping. Soils are shallow to very deep, generally excessively drained to moderately well drained, and loamy or clayey. Cropland in the area is used for a wide variety of crops, mainly corn, small grain, and forage for diary and beef cattle.

<u>144A - New England and Eastern New York Upland Southern Part:</u> This CRA is a very scenic area of rolling tohilly uplands that are broken by many gently sloping to level valleys that end in the coastal lowlands. Soils are very deep, somewhat excessively drained to poorly drained, and loamy or sandy. A small portion of the CRA is in agriculture, dominated by diary, nursery, and green house stock.

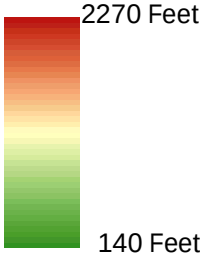
<u>148 - Northern Piedmont:</u> Most of the CRA is an eroded part of the Piedmont Plateau. It is mostly gently sloping or sloping. Intrusive dikes and sills form fairly sharp ridges within the less steep terrain. Soils are moderately deep to very deep, moderately well drained to somewhat excessively drained, and loamy to loamy-skeletal. Farms are mostly crops, forage crops, soybeans, and grain for diary cattle.

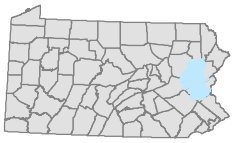




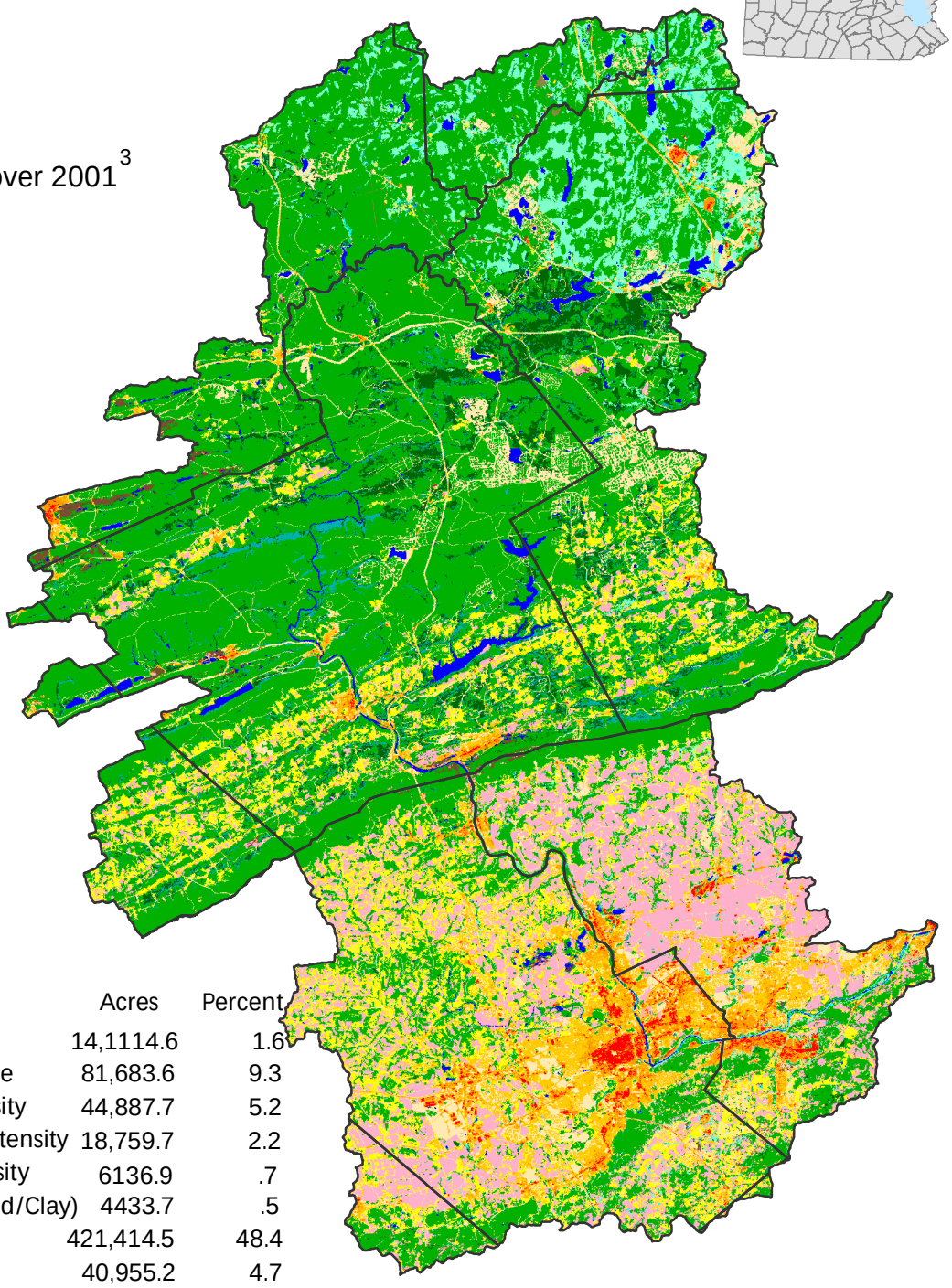
Elevation[2]

Elevation in the Lehigh Watershed ranges from 2270 feet (692 meters) at it's high point to 140 feet (43 meters) at a low point.

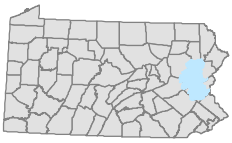


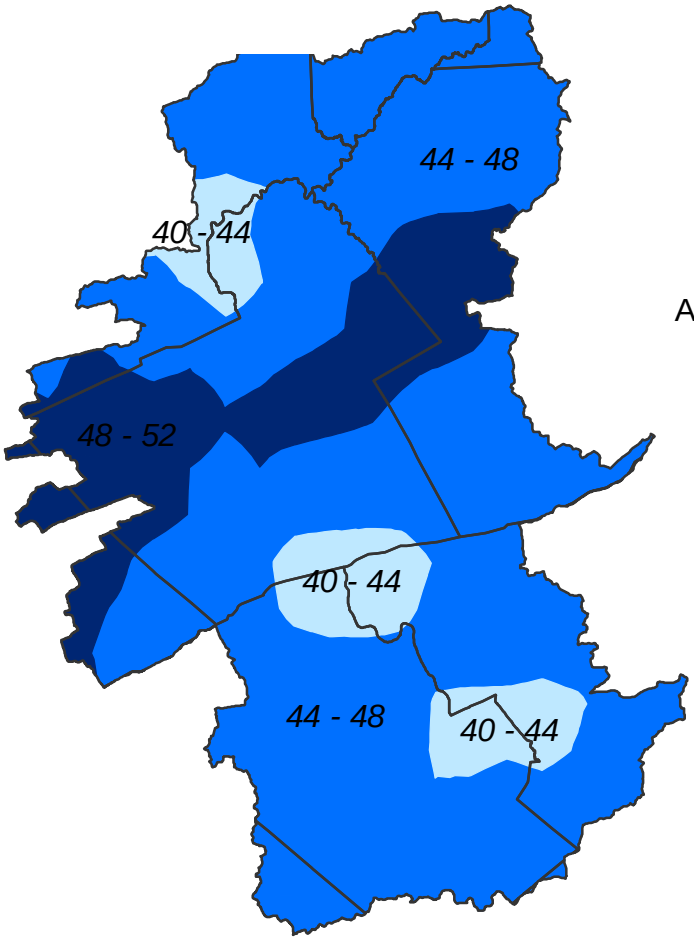


Land Use / Land Cover 2001[3]



	Acres	Percent
Water	14,1114.6	1.6
Developed, Open Space	81,683.6	9.3
Developed, Low Intensity	44,887.7	5.2
Developed, Medium Intensity	18,759.7	2.2
Developed, High Intensity	6136.9	.7
Barren Land (Rock/Sand/Clay)	4433.7	.5
Deciduous Forest	421,414.5	48.4
Evergreen Forest	40,955.2	4.7
Mixed Forest	20,156.0	2.3
Pasture/Hay	78,594.5	9.0
Cultivated Crops	99,920.0	11.4
Woody Wetlands	36,291.8	4.2
Emergent Herbaceous Wetlands	1433.9	.2
Shrub / Scrub	1338.2	.2
Grassland / Herbaceous	606.3	.1



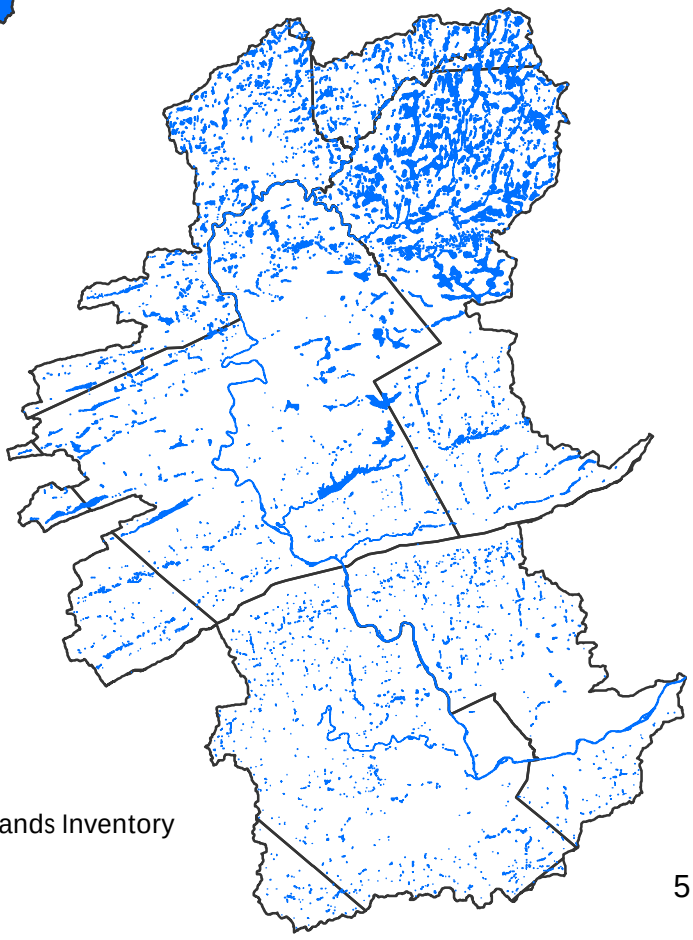


Average Annual Precipitation (Inches)[4]

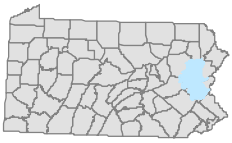
National Wetlands Inventory[5]

Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface.

NWI digital data files are records of wetlands location and classification as developed by the U.S. Fish & Wildlife Service. The classification system was adopted as a national classification standard in 1996 by the Federal Geographic Data Committee.



National Wetlands Inventory

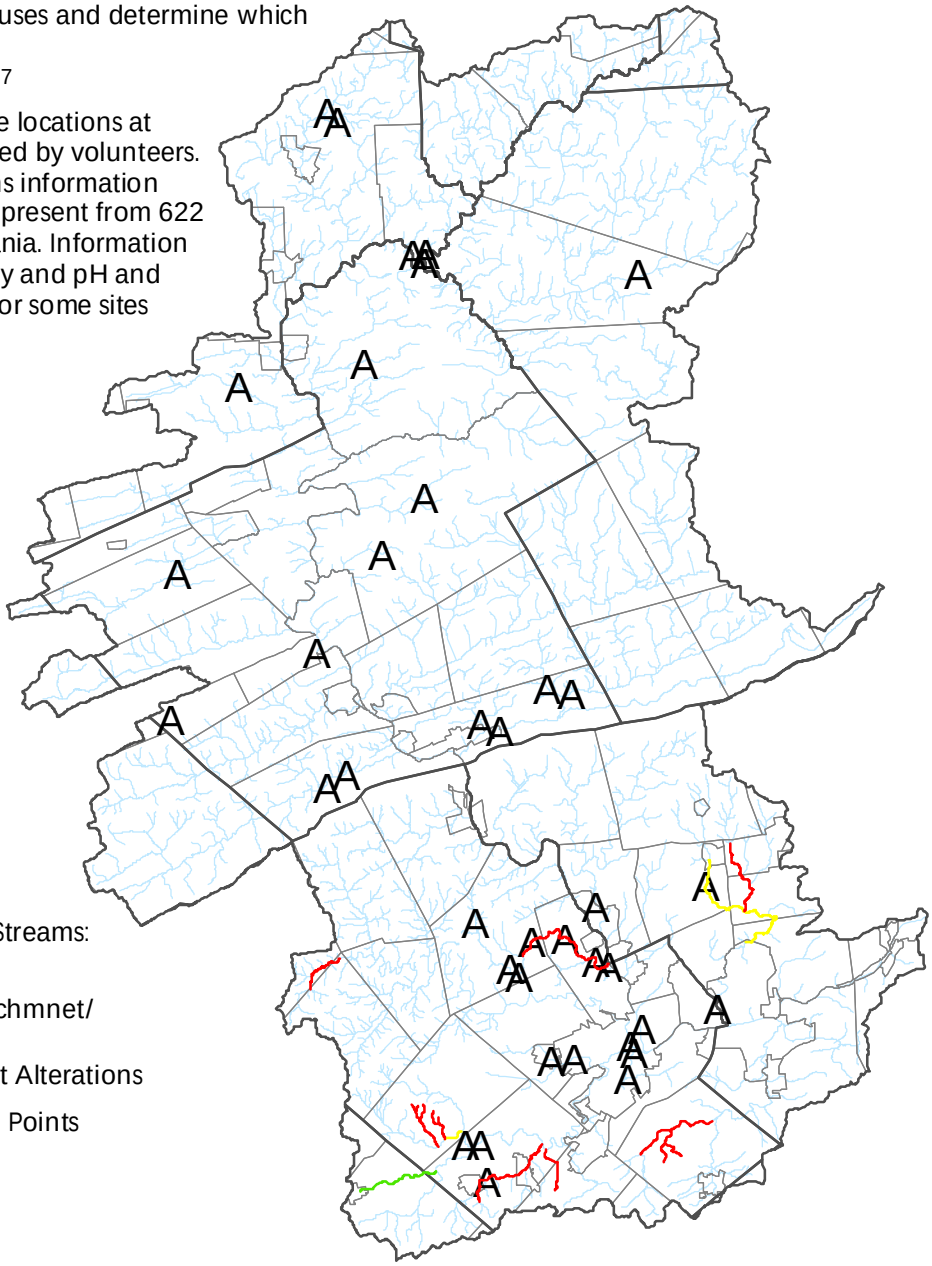


Impaired Streams[6]

The Streams Integrated List (2006)represents stream assessments in an integrated format for the Clean Water Act Section 305(b) reporting and Section 303(d) listing. PA Department of Environmental Protection protects 4 stream water uses: aquatic life, fish consumption, potable water supply, and recreation. The 305(b) layers represents stream segments that have been evaluated for attainment of those uses and determine which streams are non-attaining.

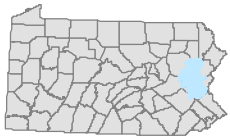
Water Quality Testing Points[7]

The water quality testing points are locations at which the water quality is monitored by volunteers. A database of these points contains information on water quality from 1986 to the present from 622 testing sites throughout Pennsylvania. Information in records includes at least alkalinity and pH and includes nitrates and phosphates for some sites since 1996.



Causes of Agriculturally Impaired Streams:

- Siltation
- Siltation and Organic Enrichmnet/ Low Dissolved Oxygen
- Siltation and Other Habitat Alterations
- A Water Quality Testing Points
- Streams
- Townships
- County Boundary

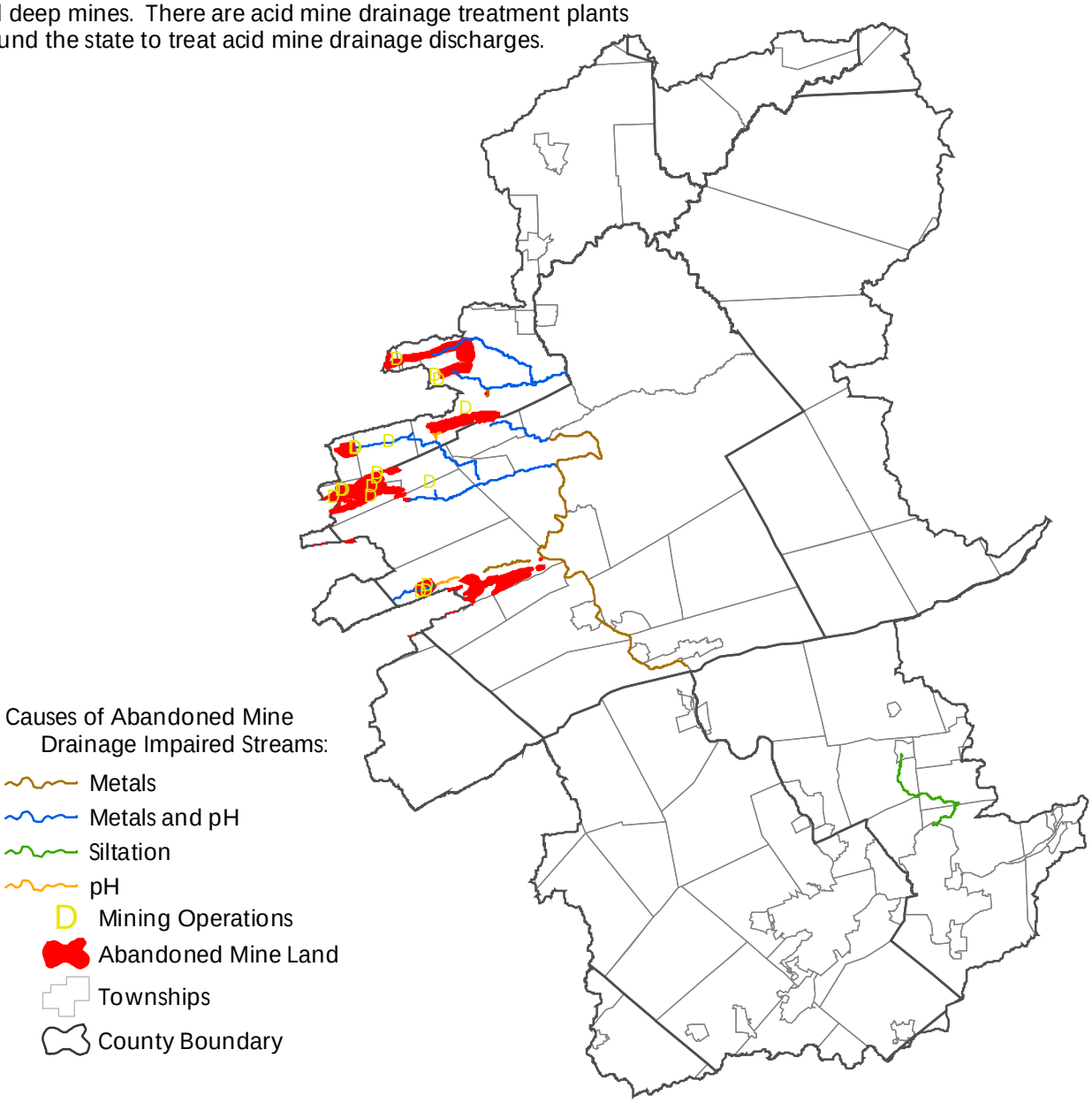


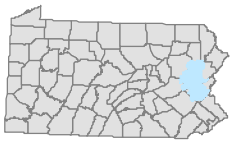
Abandoned Mine Land and Abandoned Mine Drainage Impaired Streams [8]

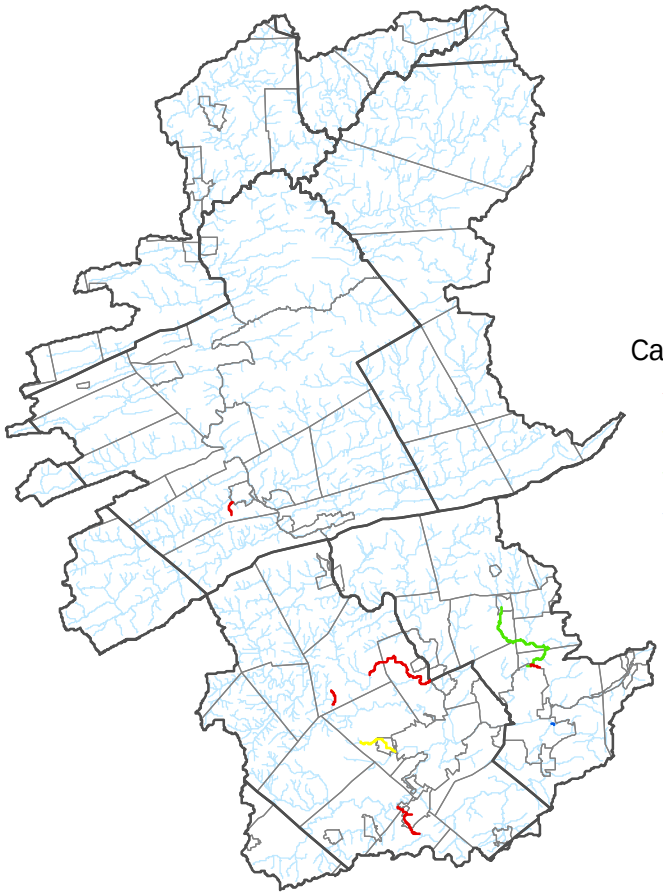
Coal mining in Pennsylvania began in the mid-1700's. Pennsylvania is the fourth largest coal producer in the United States, producing over 69.5 million tons in 1995 in 878 mining operations.

The environmental legacy of hundreds of years of coal mining in PA includes over 2,400 miles of PA's 84,000 miles of streams effected by acid mine drainage from old coal mining operations. Acid mine drainage in the single largest source of water pollution in the state.

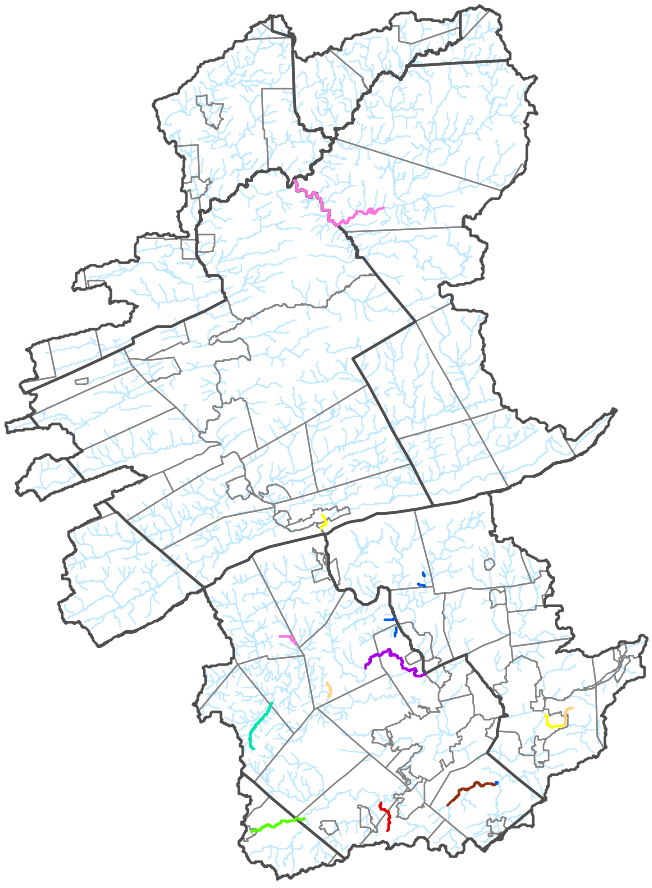
Since 1967, Pennsylvania and the federal government have invested close to $500 million to correct problems from abandoned surface and deep mines. There are acid mine drainage treatment plants around the state to treat acid mine drainage discharges.



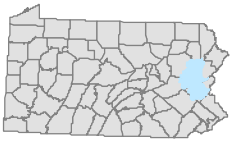


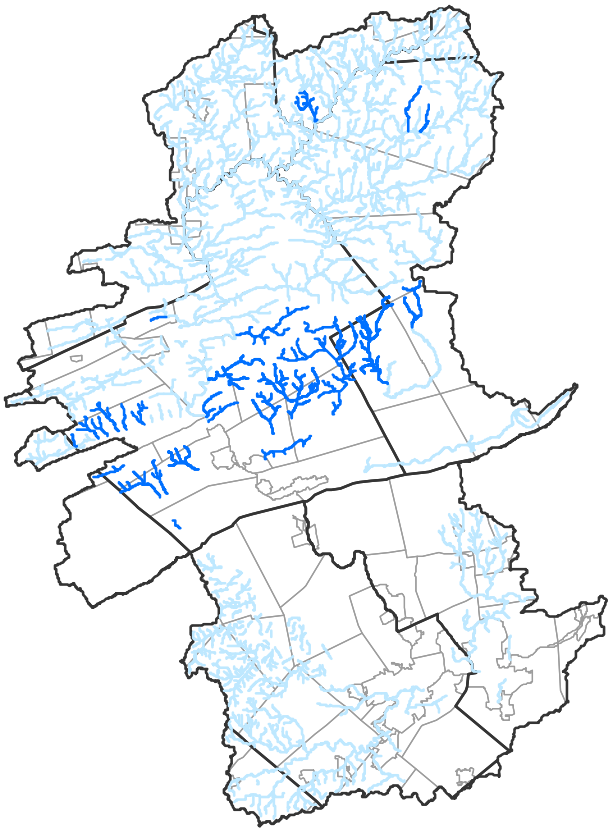


Causes of Urban Runoff/Storm Sewer Impaired Streams:
- Siltation
- Suspended Solids
- Other Habitat Alterations
- Unknown
- Streams
- Townships
- County Boundary



Other Sources of Impaired Streams:
- Construction
- Habitat Modifications
- Industrial Point Source
- Municipal Point Source
- Natural Causes
- Small Residential Runoff
- Surface Mining
- Source Unknown
- Other
- Streams
- Townships
- County Boundary





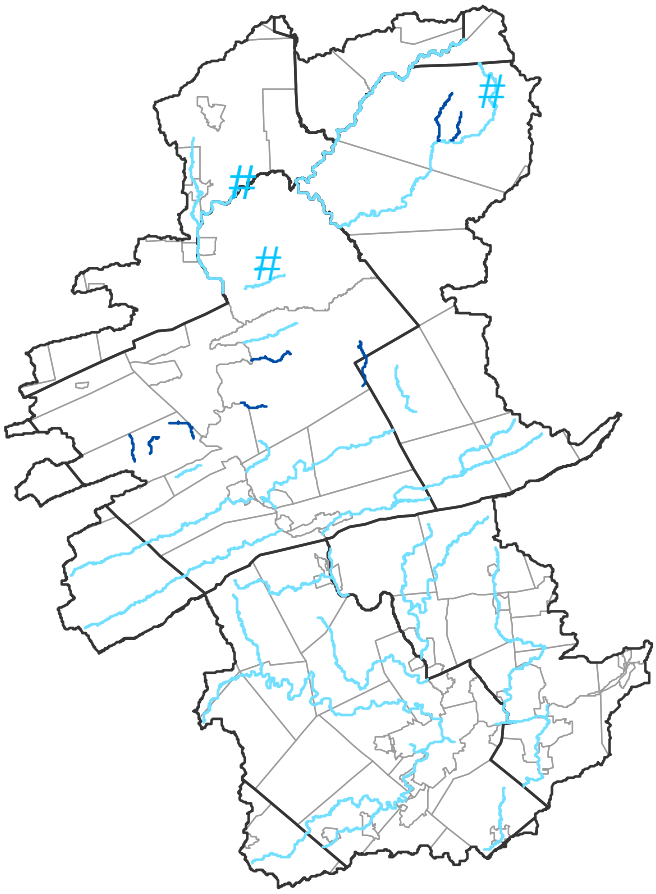
Exceptional Value and High Quality Streams[9]

In accordance to Chapter 93 of Pennsylvania Code, streams with excellent water quality may be designated High Quality Waters (HQ) or Exceptional Value Waters (EV). The water quality in an HQ stream can be lowered only if a discharge is the result of necessary social or economic development, the water quality criteria are met, and all existing uses of the stream are protected. EV waters are to be protected at their existing quality; water quality shall not be lowered.

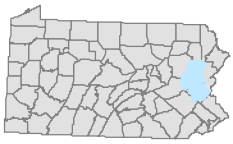
- Exceptional Value Streams
- High Quality Streams
- Townships
- County Boundary

Pennsylvania Trout Waters[10]

Approved Trout Waterbodies and Approved Trout Streams are waters which contain significant portions that are open to the public for fishing and are stocked with trout. Wilderness Trout Streams are designed to protect and promote native (brook trout) fisheries, the ecological requirements necessary for natural reproduction of trout and wilderness aesthetics. The superior quality of these watersheds is considered an important part of the overall angling experience on wilderness trout streams.



- # Approved Trout Waterbodies
- Approved Trout Streams
- Wilderness Trout Streams
- Townships
- County Boundary



Water Resource Points [11]

A Water Resource is a DEP primary facility type related to the Water Use Planning Program. The sub-facility types related to Water Resources that are included are:

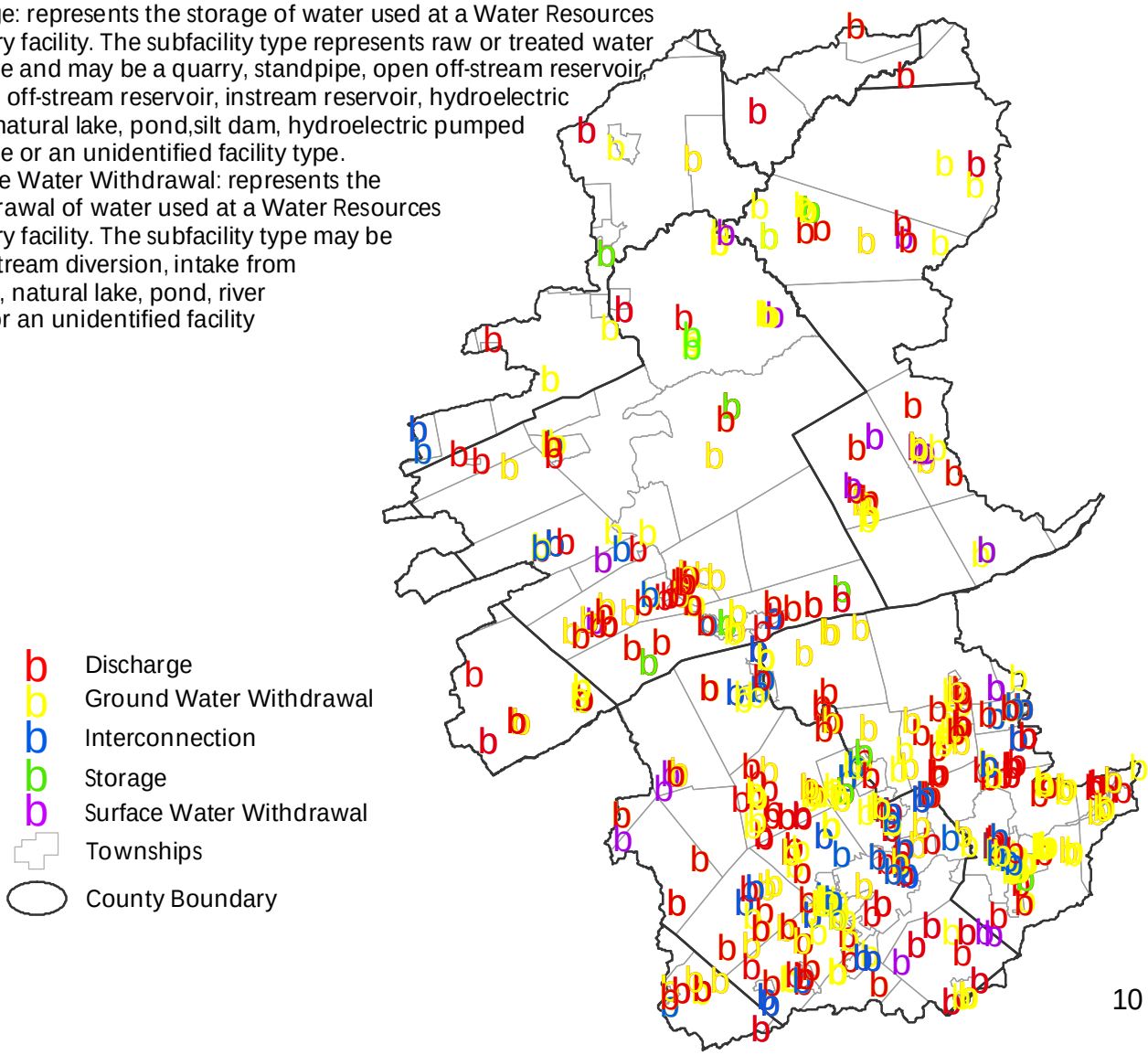
Discharge: represents the return of water used at a Water Resources primary facility. The subfacility type may be a sewage treatment plant, instream discharge, spray irrigation field, groundwater recharge, on-lot septic or an unidentified facility type.

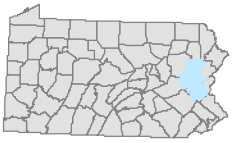
Ground Water Withdrawal: represents the withdrawal of water used at a Water Resources primary facility. The subfacility type may be a well, spring, quarry, infiltration gallery, deep mine, surface mine or an unidentified facility type.

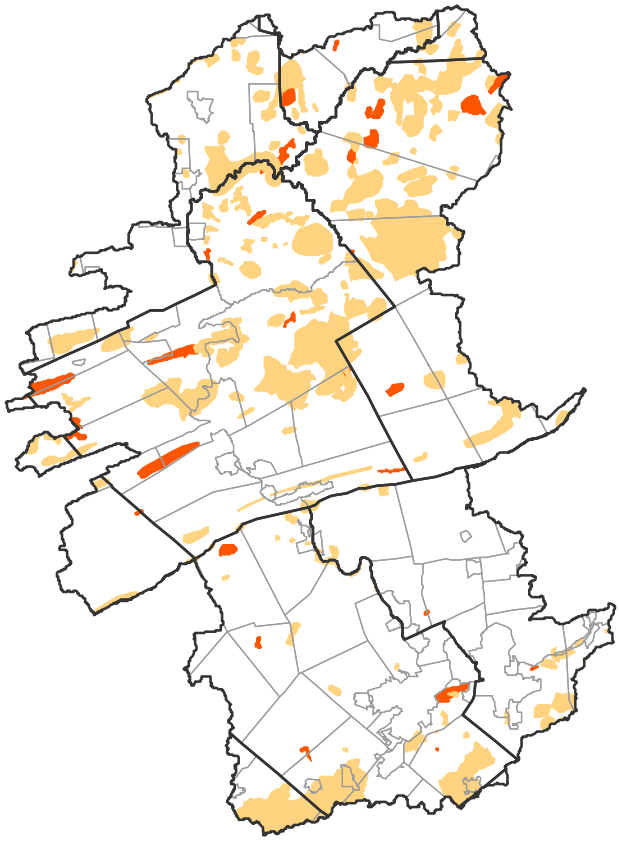
Interconnection: represents the point of interconnection between Water Resources primary facilities. The subfacility type may be for an interconnection between two public water supply agencies or between a public water supply agency and a commercial or industrial water user.

Storage: represents the storage of water used at a Water Resources primary facility. The subfacility type represents raw or treated water storage and may be a quarry, standpipe, open off-stream reservoir, closed off-stream reservoir, instream reservoir, hydroelectric dam, natural lake, pond,silt dam, hydroelectric pumped storage or an unidentified facility type.

Surface Water Withdrawal: represents the withdrawal of water used at a Water Resources primary facility. The subfacility type may be an instream diversion, intake from a dam, natural lake, pond, river well, or an unidentified facility type.







Natural Heritage Inventory Sites [12]

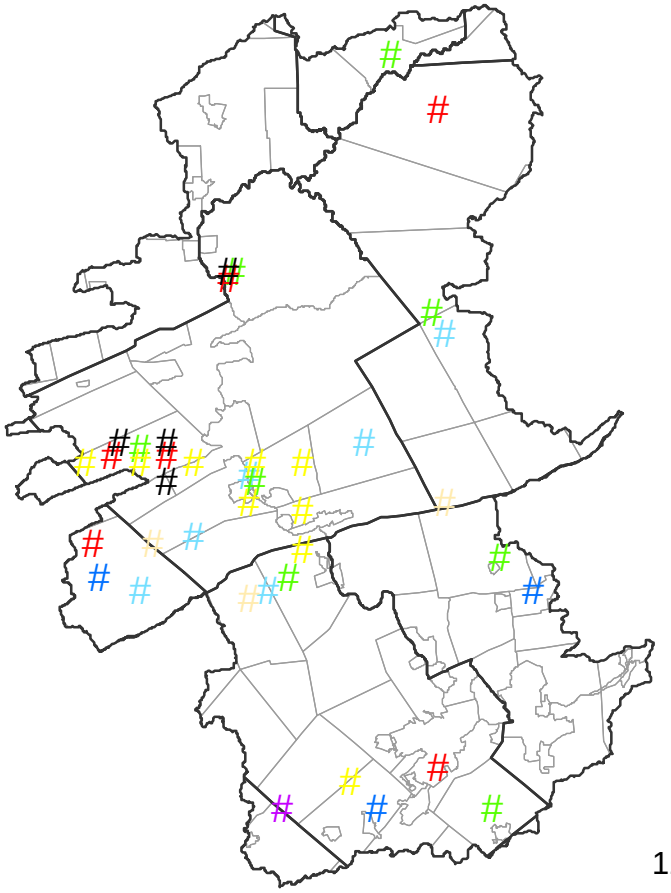
These areas are intended to identify outstanding floral, faunal, and geologic features, including natural communities (habitats) and locations of animal and plant species of special concern (endangered, threatened, or rare).
Area Types in this watershed include:
CNA - County Natural Area. This is the designation formerly used by the Eastern Office of PNHP for sites that contain elements - exemplary natural communities or species of concern as tracked by PNHP.
LS - Locally Significant: Site was not surveyed or was not found to contain PNHP elements, but is considered Locally Significant.

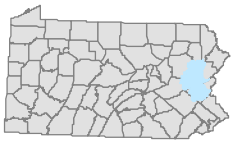
Natural Heritage Inventory Sites
- CNA
- LS
- Townships
- County Boundary

Pennsylvania Breeding Bird Atlas [13]

The 1st Pennsylvania Breeding Bird Atlas (1992) assesses the distribution of breeding birds across the state. The areas below are confirmed breeding areas for species. Fourteen birds species from Pennsylvania's state Wildlife Action Plan associated with agricultural landscapes were focused on in this assessment, not all have confirmed breeding area in this watershed.

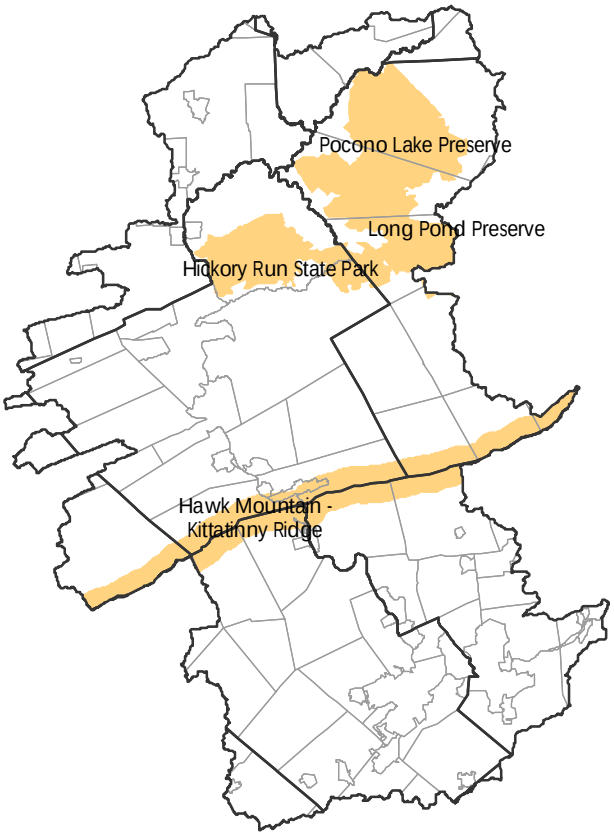
- # American Woodcock
- # Barn Owl
- # Blackbilled Cuckoo
- # Bobolink
- # Eastern Meadowlark
- # Grasshopper Sparrow
- # Northern Bobwhite
- # Redheaded Woodpecker
- Townships
- County Boundary





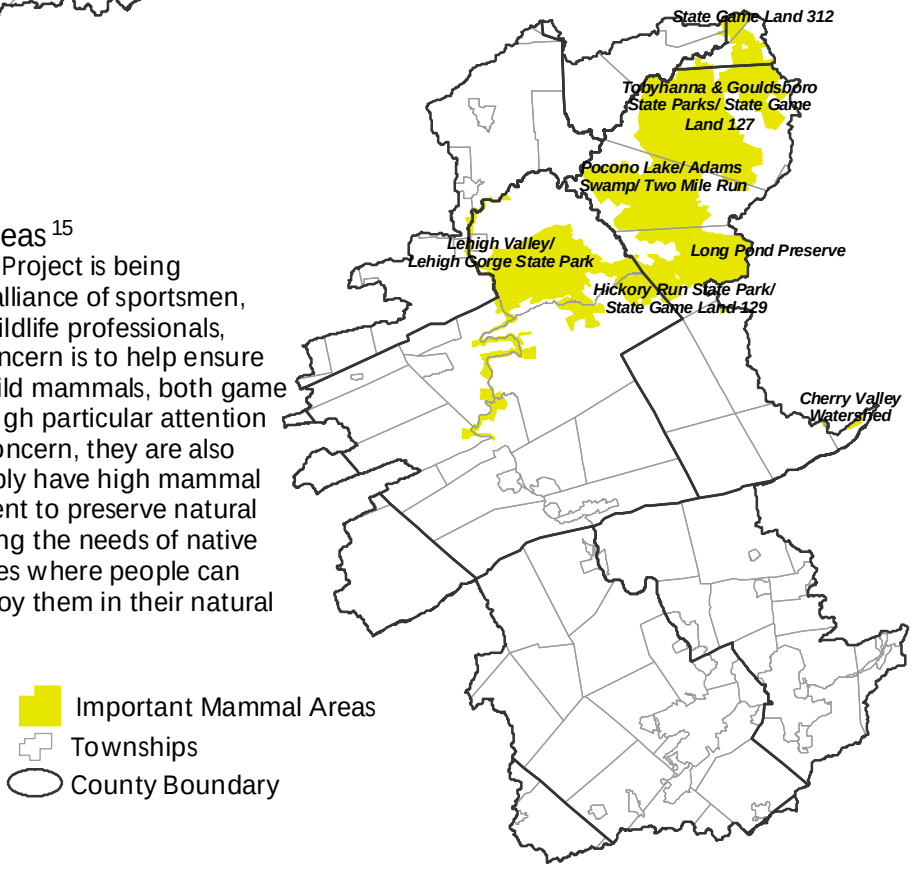
Important Bird Areas [14]

Important Bird Areas (IBA) are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. IBAs may include public or private lands, or both, and they may be protected or unprotected.

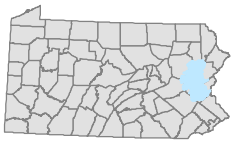


Important Mammal Areas [15]

The Important Mammal Areas Project is being carried out by a broad based alliance of sportsmen, conservation organizations, wildlife professionals, and scientists. The primary concern is to help ensure the future of Pennsylvania's wild mammals, both game and non-game species. Although particular attention is given to species of special concern, they are also interested in habitats that simply have high mammal diversity. Because a commitment to preserve natural heritage requires understanding the needs of native species, they also identify places where people can learn about mammals and enjoy them in their natural environment.

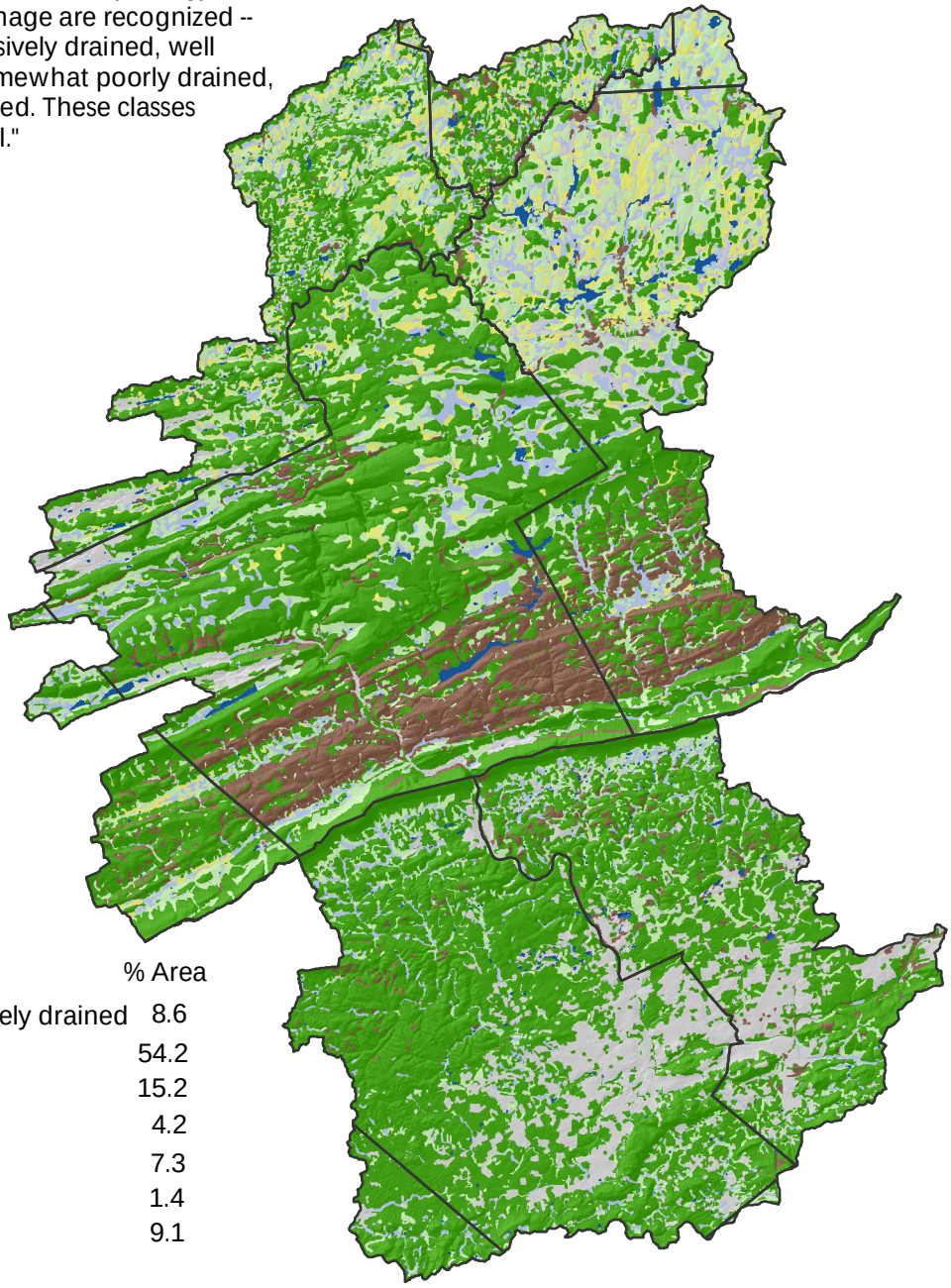


Soils [16]



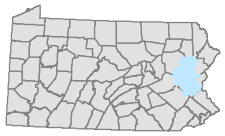
Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized -- excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."



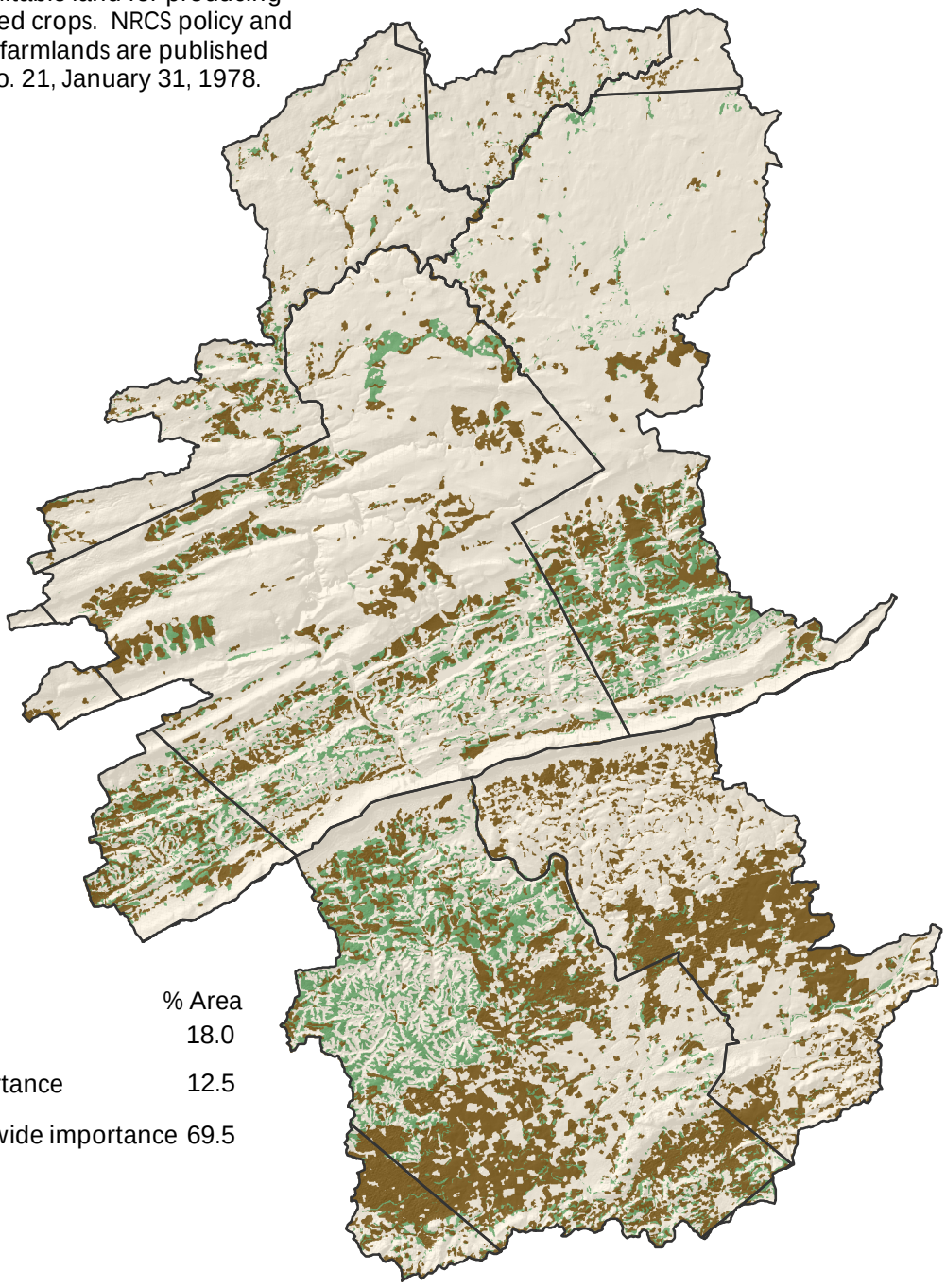
Drainage Classification

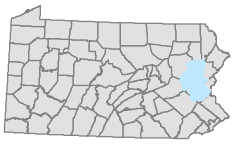
	% Area
Excessively - Somewhat excessively drained	8.6
Well drained	54.2
Moderately well drained	15.2
Somewhat poorly drained	4.2
Poorly -Very poorly drained	7.3
Water	1.4
Unclassified	9.1
County Boundary	



Farmland Classification

Farmland classification identifies soil map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No. 21, January 31, 1978.

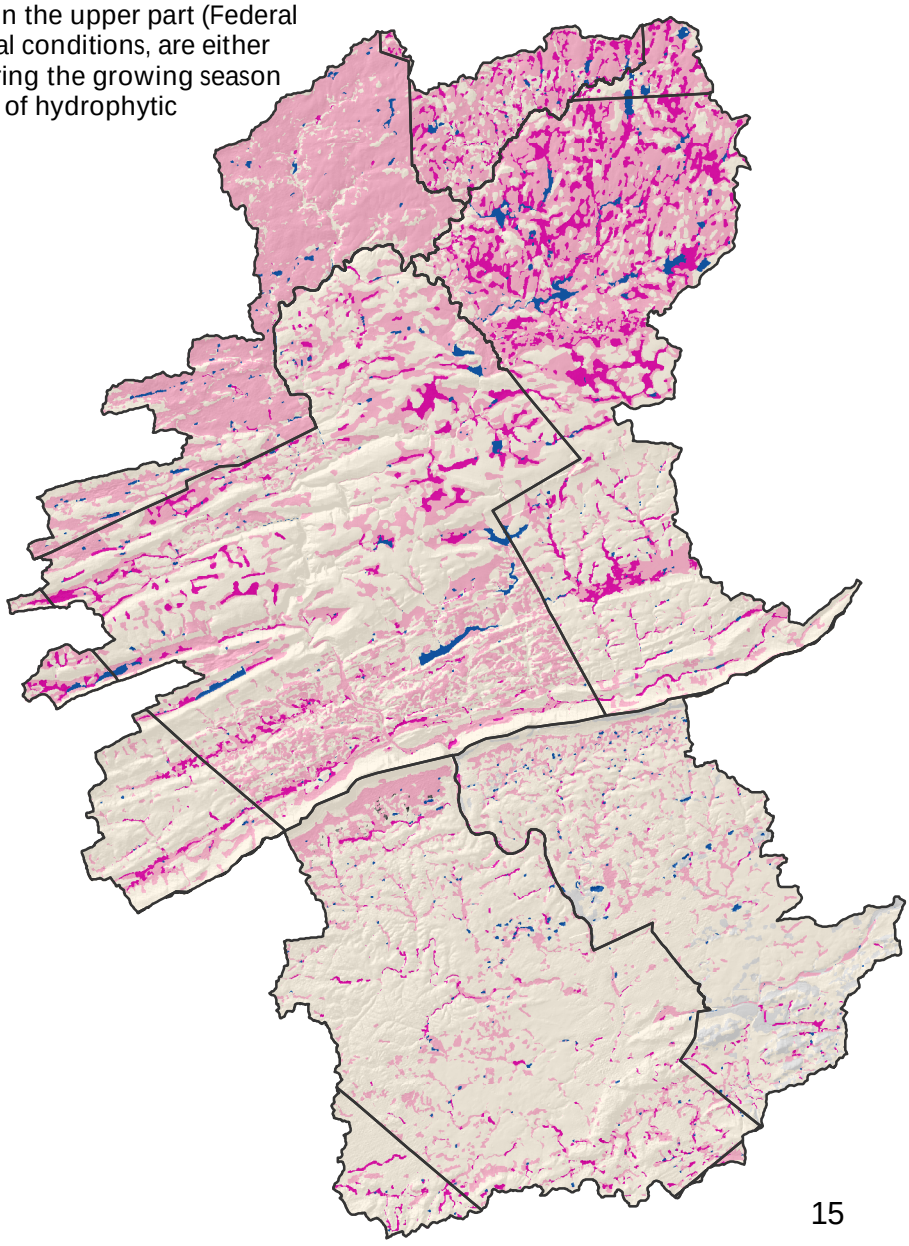


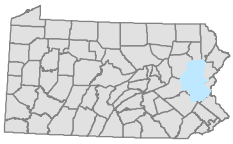


Hydric Soil Classification

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

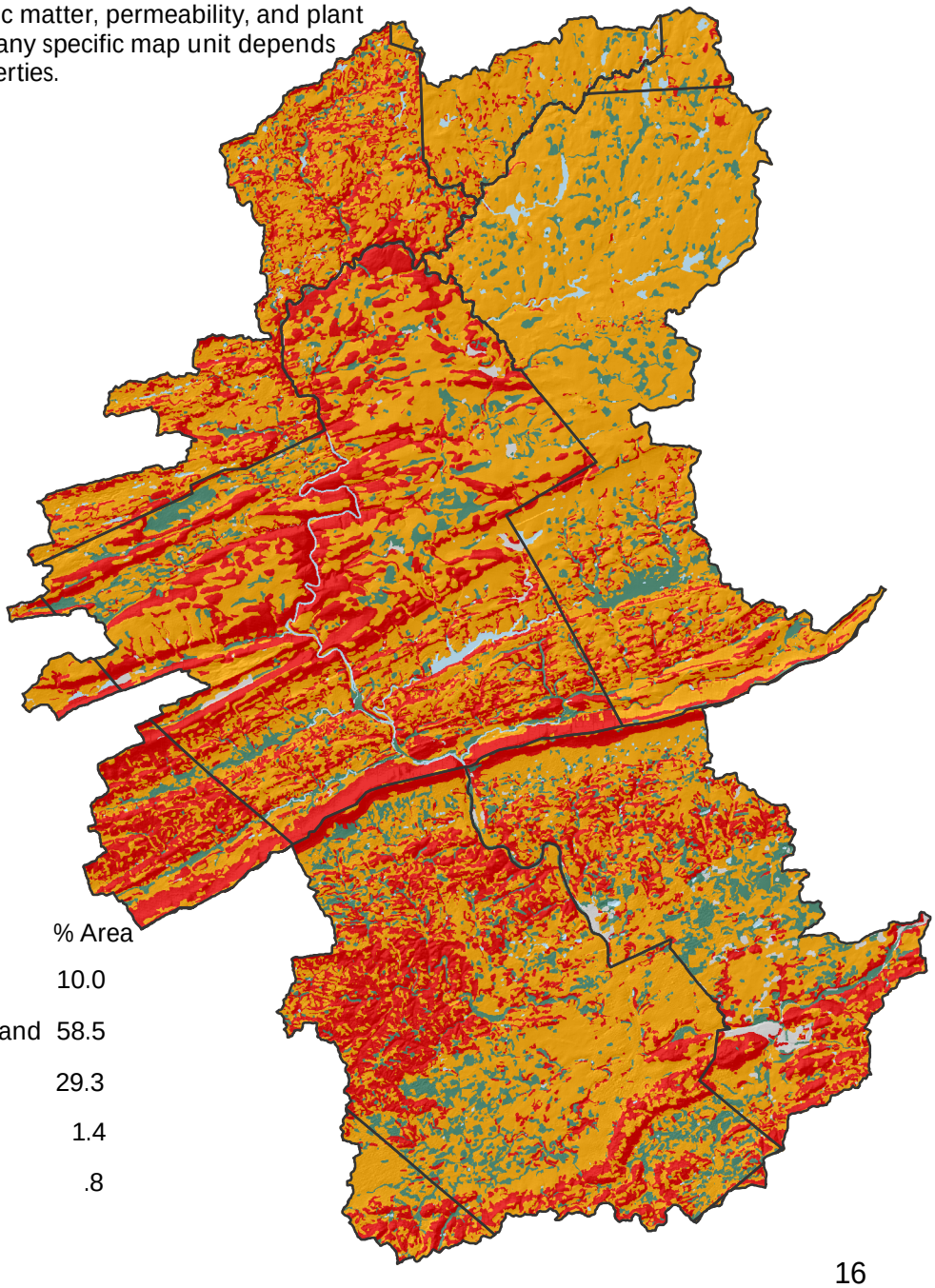
Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.



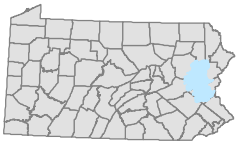


Highly Erodible Land

A soil map with an erodibilty index (EI) of 8 or greater is considered to be highly erodible land (HEL). The EI for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil in the FOTG as of January 1, 1990. Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.

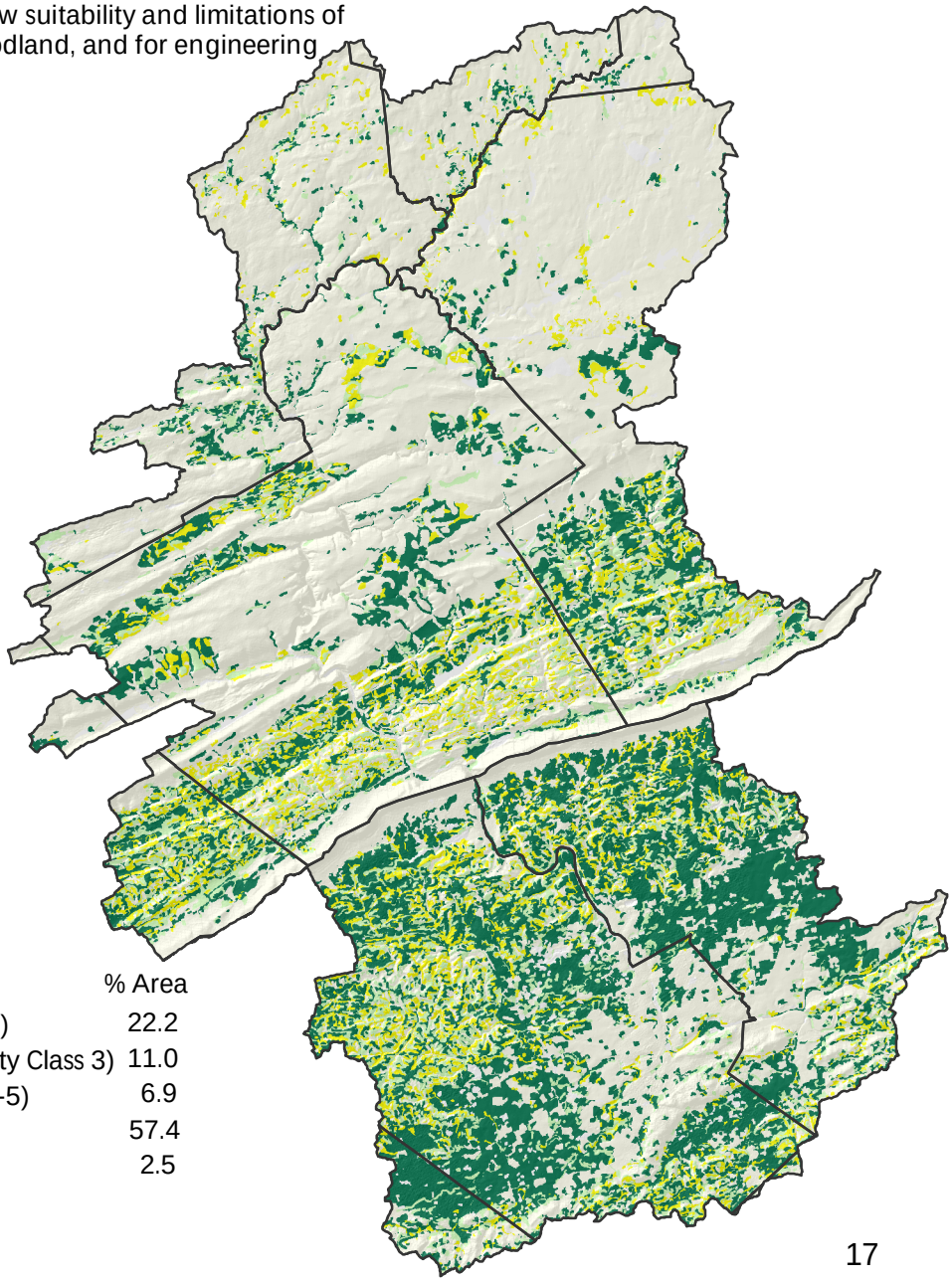


Erosion Classification	% Area
Not highly erodible land	10.0
Potentially highly erodible land	58.5
Highly erodible land	29.3
Water	1.4
Unrated	.8
County Boundary	

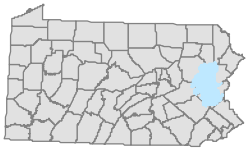


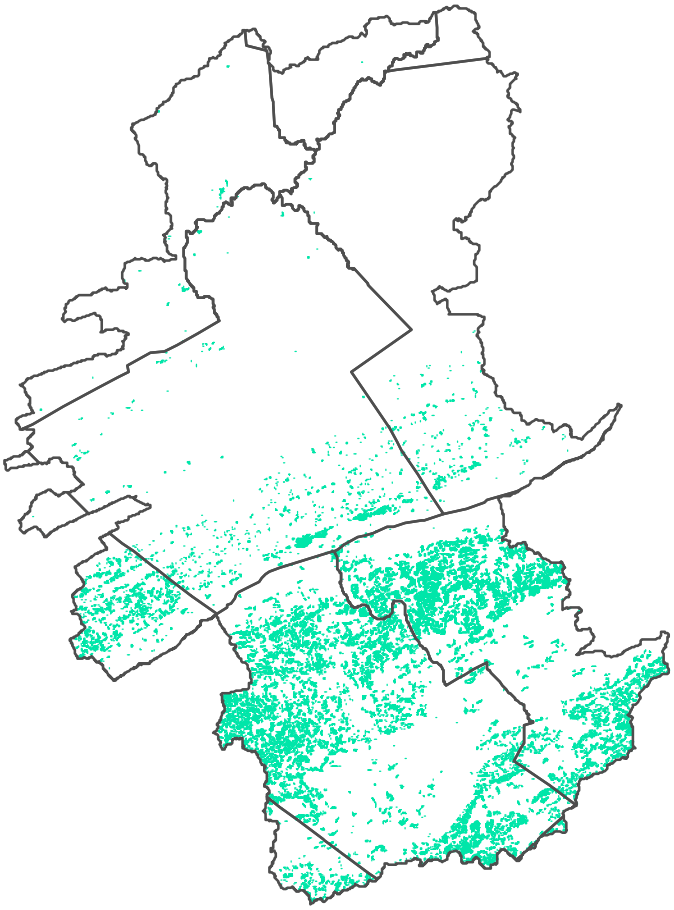
Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.



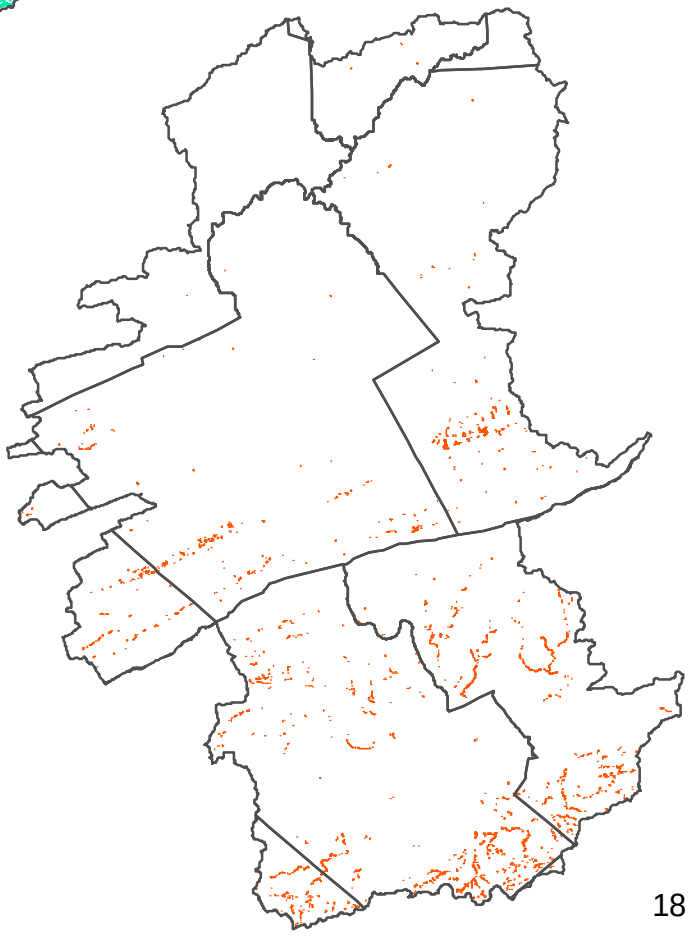
Land Capability Classification	% Area
Well Suited (Capability Class 1 -2)	22.2
Moderately well suited (Capability Class 3)	11.0
Poorly suited (Capability Class 4 -5)	6.9
Unsuited (Capability Class 6 - 8)	57.4
Unclassified	2.5
County Boundary	





Cropland on Highly Erodible Land

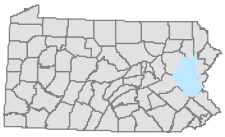
There are 24,566.9 acres on highly erodible land, which is approximately 24.6% of all the cultivated cropland in the watershed.

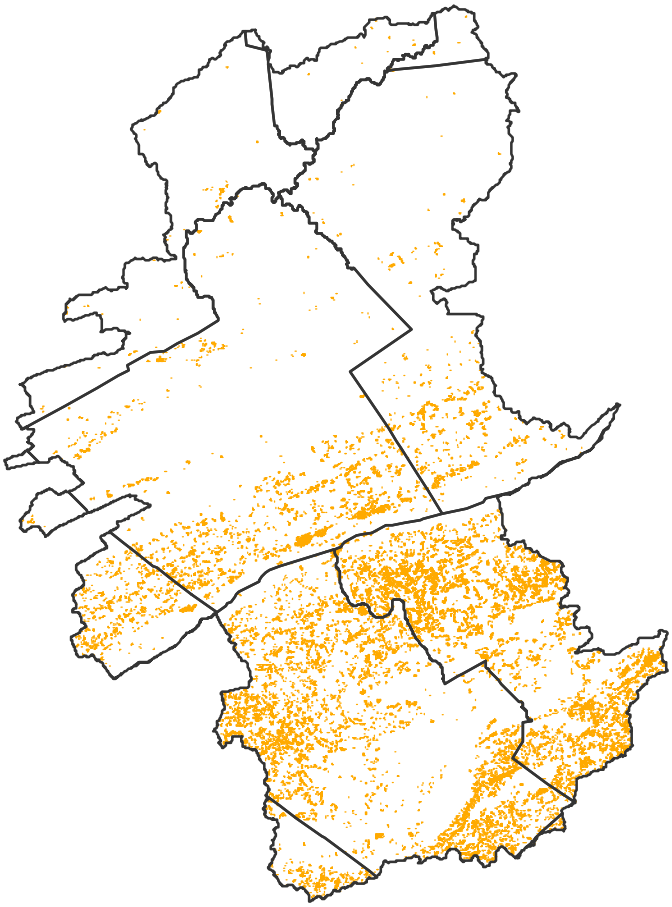


Cropland on Hydric Soils

There are 1501.5 acres on hydric soils, which is approximately 1.5% of all the cultivated cropland in the watershed.

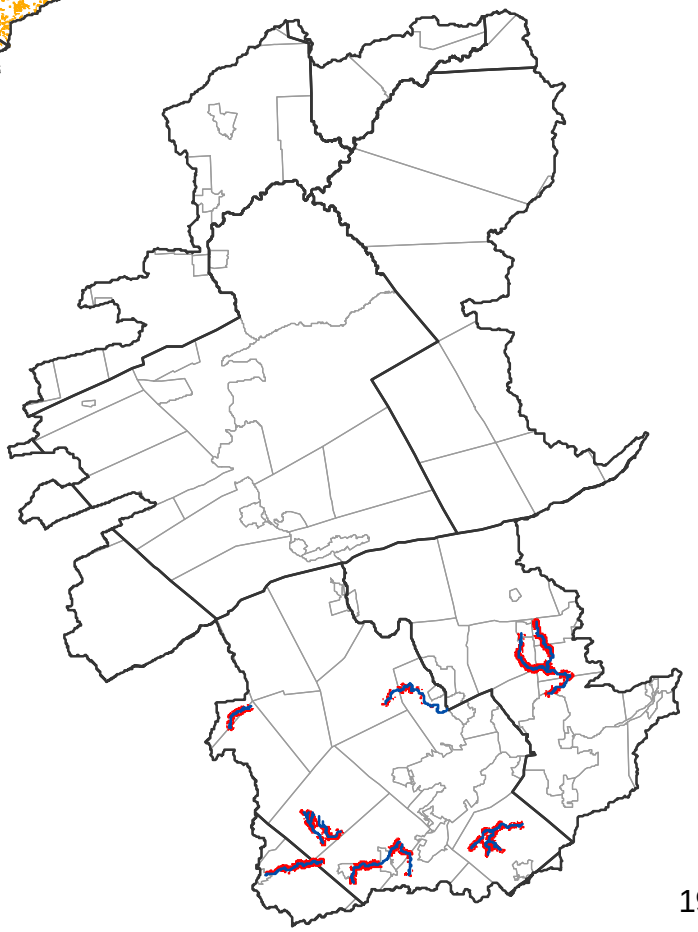
Lehigh Watershed



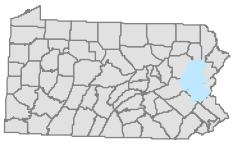


Cropland on Poor or Unsuited Soil

There are 15,432.0 acres on poor or unsuited land, which is approximately 15.4% of all the cultivated cropland in the watershed.



Cropland within 1000 feet of an Agricultural Impaired Stream



Resource Concerns

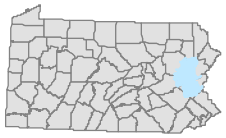
Major resource concerns in the area include:

- erosion
- reduction of organic matter on cropland
- soil productivity
- soil wetness
- sedimentation
- conversion of nonurban ladn to urban

Conservation Practices

Common conservation practices for cropland:

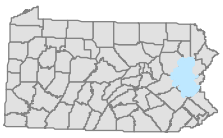
- crop rotation
- contour farming
- crop residue management
- contour stripcropping
- conservation tillage
- nutrient management
- cover crops
- diversions
- grassed waterways



PRS Performance Measures[17]

	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Total
Total Conservation Systems Planned (acres)	6546	8398	3866	3668	5729	NA	1490	2262	31,959
Total Conservation Systems Applied (acres)	1582	3439	2786	3303	2603	NA	1038	2034	16,785
Key Conservation Treatments									
Waste Storage Facility (number)	0	0	0	1	0	0	0	3	4
Riparian Forest Buffer (acres)	7	52	33	58	22	2	0	10	184
Erosion Control Total Soils Saved (tons/year)	1446	3123	3446	2548	1477	NA	NA	NA	12,040
Nutrient Management (acres)	0	203	1300	2623	2112	176	414	302	7,130
Pest Management (acres)	0	141	259	684	353	160	414	145	2,156
Prescribed Grazing (acres)	19	50	11	59	23	16	0	4	182
Tree and Shrub Establishment (acres)	0	0	0	15	0	2	0	0	17
Residue Management (acres)	949	1207	3187	1753	250	569	445	887	9,247
Wildlife Habitat (acres)	65	33	221	404	186	186	225	361	1,681
Wetlands Created, Restored, or Established	0	0	21	0	12	0	12	0	45
Acres in Conservation Programs									
Conservation Technical Assistance									
Planned	5433	8113	3632	2540	5302	NA	1404	2019	28,443
Applied	1304	3191	1622	2834	2589	NA	719	1242	13,501
Conservation Reserve Program									
Planned	0	0	234	149	70	NA	267	133	853
Applied	0	0	309	346	41	NA	246	439	1,381
Environmental Quality Incentive Program									
Planned	0	0	466	132	237	NA	81	353	1,269
Applied	13	0	0	0	0	NA	116	492	621
Farmland Protection Policy/Farm and Ranch Lands Protection Program									
Planned	835	1435	168	0	0	NA	0	0	2,438
Applied	213	764	90	0	0	NA	0	0	1,067
Forestry Incentive Program									
Planned	0	0	0	0	0	NA	0	0	0
Applied	0	0	0	0	0	NA	0	0	0
Grasslands Reserve Program									
Planned				0	0	NA	0	0	0
Applied				0	0	NA	0	0	0
Grazing Lands Conservation Initiative									
Planned	0	0	48						48
Applied	0	0	108						108
Wildlife Habitat Incentive Program									
Planned	65	0	0	0	0	NA	0	0	65
Applied	0	0	0	0	0	NA	0	56	56
Wetlands Reserve Program									
Planned	0	0	0	0	0	NA	0	0	0
Applied	0	0	0	0	0	NA	0	0	0

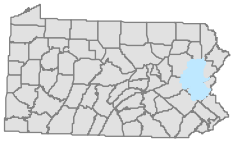
NA - Reporting was unavailabel by Hydrologic Unit Code



Social and Census Data[18]

	Berks	Bucks	Carbon	Lackawanna	Lehigh	Luzerne	Monroe	Northampton	Schuylkill	Wayne	Total
Farms (number)	45	2	201	26	493	80	136	231	62	11	1,287
Land in farms (acres)	5,392	154	18,833	2,964	72,861	10,690	13,867	36,762	8,210	1,811	171,544
Total cropland (acres)	4,331	117	13,645	1,998	58,296	5,759	7,987	31,380	5,798	910	130,221
Principal operator by primary occupation - Farming (number)	28	1	88	15	272	37	62	143	30	7	683
Farms by Size											
1 to 9 acres	6	0	31	3	69	9	16	42	6	0	182
10 to 49 acres	16	1	68	6	237	24	56	88	21	1	518
50 to 179 acres	14	0	73	13	118	34	44	55	25	5	381
180 to 499 acres	7	0	23	4	41	11	17	23	7	3	136
500 to 999 acres	2	0	5	0	13	2	2	14	2	0	40
1,000 acres or more	0	0	0	0	14	1	1	9	1	0	26
Livestock and Poultry											
Cattle and calves inventory (farms)	19	0	41	10	77	23	29	60	14	6	279
Cattle and calves inventory - Beef cows (farms)	6	0	18	7	51	14	18	29	7	3	153
Cattle and calves inventory - Milk cows (farms)	8	0	7	4	14	6	4	17	4	2	66
Hogs and pigs inventory (farms)	3	0	18	1	22	3	5	17	3	0	72
Sheep and lambs inventory (farms)	3	0	18	0	38	3	13	13	1	1	90
Layers 20 weeks old and older inventory (farms)	4	0	14	1	36	5	20	24	5	1	110
Broilers and other meat-type chickens sold (farms)	1	0	3	0	6	1	4	4	2	0	21
Crops Harvested											
Corn for grain (acres)	909	28	1000	84	20,722	859	1,489	12,476	1,281	8	38,856
Corn for silage or greenchop (acres)	678	4	534	65	1,032	219	1,413	1,344	332	36	5,657
Wheat for grain, all (acres)	243	6	396	(D)	5,941	176	267	2,361	372	(D)	9,762
Oats for grain (acres)	87	2	785	5	1,188	262	325	667	228	1	3,550
Barley for grain (acres)	98	0	54	0	801	5	9	251	56	(D)	1,274
Soybeans for beans (acres)	615	15	300	0	13,493	287	776	5,214	589	(D)	21,289
Forage - land used for all hay and all haylage, grass silage, and greenchop (acres)	1,260	32	4,377	1,143	8,674	1,882	2,237	5,569	1,328	631	27,133
Vegetables harvested for sale (acres)	25	3	368	81	390	245	105	262	91	1	1,571
Land in orchards (acres)	33	1	33	16	946	52	40	189	42	2	1,354
Total cropland harvested (acres)	3,853	100	10,266	1,454	52,925	4,262	5,941	28,818	4,716	689	113,024
Farm Operator by Ethnicity											
White	68	3	309	38	722	113	217	350	88	15	1,923
Black or African American	0	0	0	0	3	0	0	0	0	0	3
Asian	0	0	0	0	2	0	0	0	0	0	2
Hispanic	0	0	3	1	6	0	0	3	0	0	13
American Indian/Alaskan Native	0	0	0	0	3	0	0	1	0	0	4
Pacific Islander	0	0	0	0	0	0	0	0	0	0	0
Women	19	1	83	8	195	27	62	99	20	4	518

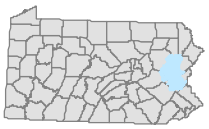
(D) - Withheld to avoid disclosing data for individual farms



Partnership Groups:

A cooperative project involving NRCS and conservation partners, including:

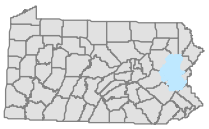
- State Conservation Commission
- Pennsylvania Department of Environmental Protection
- Pennsylvania Game Commission
- Pennsylvania Grazing/Forage Lands Conservation Coalition
- Pennsylvania Fish & Boat Commission



Footnotes/Bibliography

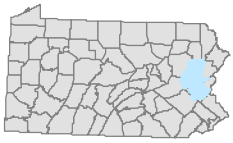
All data is provided "as is". There is no warranties, express or implied, including the warranty of fitness for a particular purpose, accompanying this document. Use for planning purpose only.

1. Common Resource Area
   Common Resource Area (CRA) delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. More information can be found online at http://soils.usda.gov/survey/geography/cra.html
2. National Elevation Dataset (NED)
   The NED is a seamless mosaic of the best-available elevation data. The primary source data were the USGS 7.5-minute (30-meter or 10-meter resolution) DEM's. A hillshade grid was also created using the DEM and used to creare a 3-D effect. More inforamtion on NED can be found online at http://ned.usgs.gov/
3. Land Use / Land Cover 2001
   Land Use / Land Cover map was created using the National Land Cover Dataset. The National Land Cover Dataset was compiled from Landsat satellite TM imagery with a spatial resolution of 30 meters and supplemented by various ancillary data (where available). More inforamtion can be found online at http://landcover.usgs.gov/
4. Average Annual Precipitation
   The average annual precipitation data for this map layer were produced through a partnership between NRCS and the Spatial Climate Analysis Service at Oregon State University (OSU). The average annual precipitation is from 1961 through 1990. More information can be found online at http://www.ncgc.nrcs.usda.gov/products/datasets/climate/index.html
5. National Wetlands Inventory (NWI)
   The NWI maps do not show all wetlands since the maps are derived from aerial photointerpretation with varying limitations due to scale, photo quality, inventory techniques, and other factors. More information can be found online at http://www.fws.gov/nwi/
6. Impaired Streams
   Impaired Streams were derived from Pennsylavania Department of Protection Office of Water Management, 2006 list on Non-Attaining Streams. More information can be found on DEP website at http://www.depweb.state.pa.us/dep/site/default.asp
7. Water Quality Testing Points
   Water Quality Testing Points monitor water quality with emphasis on stream acidity in Pennsylvania with an assoiciated database. The database contains more than 33,466 records on water quality from 1986 to the present from 622 testing sites throughout Pennsylvania. Information in the records includes alkalinity and Ph and includes nitrates and phosphates for some sites since 1996. The information is maintained by the Alliance for Aquatic Resource Monitoring. More information can be found online at http://alpha.dickinson.edu/storg/allarm/allarm%20projects/database.htm



Footnotes/Bibliography

8. Abandoned Mine Land
   Abandoned Mine Land data was received from the Office of Surface Mining. The data set shows the approximate location of Abandoned Mine Land Problem Areas containing public health, safety, and public welfare problems created by past coal mining. More information can be found online at http://www.osmre.gov/osmaml.htm
9. Exceptional Value and High Quality Streams
   Exceptional Value and High Quality Streams were taken from the Chapter 93 data layer received from Pennsylvania Department of Environmental Protection. For more information on what qualifies a stream as exceptional value or high quality or any information on Chapter 93 streams go to http://www.pacode.com/secure/data/025/chapter93/chap93toc.html
10. Pennsylvania Trout Waters
    Pennsylvania Trout Water data is compiled by the Pennsylvania Fish and Boat Commission. This layer was created based on the 1:24000 National Hydropahy Dataset (NHD) water bodies layer. More information can be found online at http://www.fish.state.pa.us/fishpub/summary/troutwaters.html
11. Water Resource Points
    A Water Resource is a DEP primary facility type related to the Water Use Planning Program. More information can be found http://www.depweb.state.pa.us/dep/site/default.asp
12. Natural Heritage Inventory Sites
    The Natural Areas polygons were developed by the Pennsylvania Natural Heritage Program (PNHP) County Natural Heritage Inventory (CNHI) Program. Natural Areas were identified using map and air photo interpretation, aerial rconnaissance, and field surveys. More information and county reports can be found online at http://www.naturalheritage.state.pa.us/
13. Pennsylvania Breeding Bird Atlas
    Data was taken for the 1st Pennsylvania Breeding Bird Atlas (1992). For this watershed assessment, fourteen bird species were chosen to be focused on. More information about all bird species can be obtained at http://www.carnegiemnh.org/atlas/home.htm
14. Important Bird Areas
    The Important Bird Areas Program (IBA) is a global effort to identify and conserve areas that are vital to birds and other biodiversity. For more information nationally and/or on the state level go to http://www.audubon.org/bird/iba/
15. Important Mammal Areas
    Important Mammal Areas Project, IMAP, the first program of it's kind, was created by the Mammal Technical Committee of the Pennsylvania Biological Survey (PaBS). For more inforamtion go online to http://www.pawildlife.org/imap.htm



Footnotes/Bibliography

16. Soils

Soil Survey spatial and tabular data were used for the following survey areas:

Berks County (PA011)
Bucks County (PA017)
Carbon County (PA025)
Lackawanna County (PA069)
Lehigh County (PA077)
Luzerne County (PA079)
Monroe County (PA089)
Northampton County (PA095)
Schuylkill County (PA107)
Wayne County (PA127)

Spatial and tabular data an be downloaded at http://soildatamart.nrcs.usda.gov/

17. Performance Results System (PRS)

PRS data was extracted from PRS by year, conservation system, conservation practice, and proagrams by hydrologic unit code. More information can be found online at the PRS homepage http://ias.sc.egov.usda.gov/prshome/

18. Social and Census Data

Ag census data and ethnicity data were downloaded from the National Agricultural Statistics Service (NASS). The data was adjusted by percent of Hydrologic unit in the county. More inforamtion can be found online at http://www.nass.usda.gov/Census_of_Agriculture/index.asp